

# OCCURRENCE AND DISTRIBUTION OF SOFT CORALS (OCTOCORALLIA: ALCYONACEA) FROM THE ANDAMAN AND NICOBAR ISLANDS<sup>1</sup>

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(With a text-figure)

**Key words:** Alcyonacea, soft corals, distribution, Andaman & Nicobar Islands, new record

Occurrence and new distributional records for 26 species of Alcyonaceans are given. These include 12 species of *Sinularia*, 6 of *Lobophytum*, 6 of *Sarcophytum*, one of *Cladiella* and one of *Nephtea*. Their ecological information on habitat and associations with the other organisms is also noted. A major factor limiting the distribution of soft corals is the availability of hard substratum for settlement. Other factors that determine their faunistic composition and abundance are correlated with resistance to harsh environments and life history parameters. Competitive interaction with other benthic reef-organisms also plays a major role in the distribution of soft corals in the Andaman and Nicobar Islands.

## INTRODUCTION

Though studies on the systematics and distribution of Indian Ocean octocorals were initiated during the last century and have been continued to the present time knowledge on the group is scanty. In spite of the earlier surveys information on octocorals in some parts of the Indian Ocean is limited. These areas include certain remote island groups such as the Andaman and Nicobar Islands, as well as Lakshadweep, Mandapam area on the east coast and Sri Lanka. Apart from the "Investigator" Expedition collections (Thomson and Henderson 1906 and Thomson and Simpson 1909), a few reports mention soft corals in recent literature on Lakshadweep (Pratt 1903, 1905; Hickson 1903, 1905; Van of Wegen and Vennam 1991 and Alderslade and Prita 1991).

The Andaman and Nicobar Islands spread out in the Bay of Bengal between Lat. 6°45' N and 13°45' N and Long. 92°15' E and 94°0' E have one of the richest coral reef formations with fringing reefs on the eastern side and barrier reefs on the western side (Anon. 1977, Pillai 1983, Tikader 1986). The present communication deals with the distribution and new records of soft corals in the Andaman Sea.

## MATERIALS AND METHODS

Field observations were made and the soft corals were collected at windward reef at North Bay (depth 3-5 m), and Carbyn's Cove, Chiriatapu and Burmanaal (intertidal) and on the New Wandoor (3-5 m), western coast of south Andaman by surface snorkelling. At each locality, details of habitat type and water depth and other field conditions were recorded along with their quantitative availability. The material made available by the Institute of Chemical Technology (I.I.C.T.), Hyderabad and organic chemistry group of Andhra University, Waltair from the eastern side of Andaman from Mayabundar, Digilipur and Rangath (Intertidal) were also studied and included (Fig. 1). All the material, preserved in 70% ethanol, are deposited in the Marine Biology Museum and Taxonomy Reference Centre at the National Institute of Oceanography, Goa.

## RESULTS AND DISCUSSION

Throughout the systematic account, references are often given just to major works such as Verseveldt (1970, 1971, 1980, 1982, 1983), Verseveldt and Benayahu (1983) and Tixier-Durivault (1945, 1951, 1956, 1958, 1966, 1970) from which the original specific descriptions can be traced.

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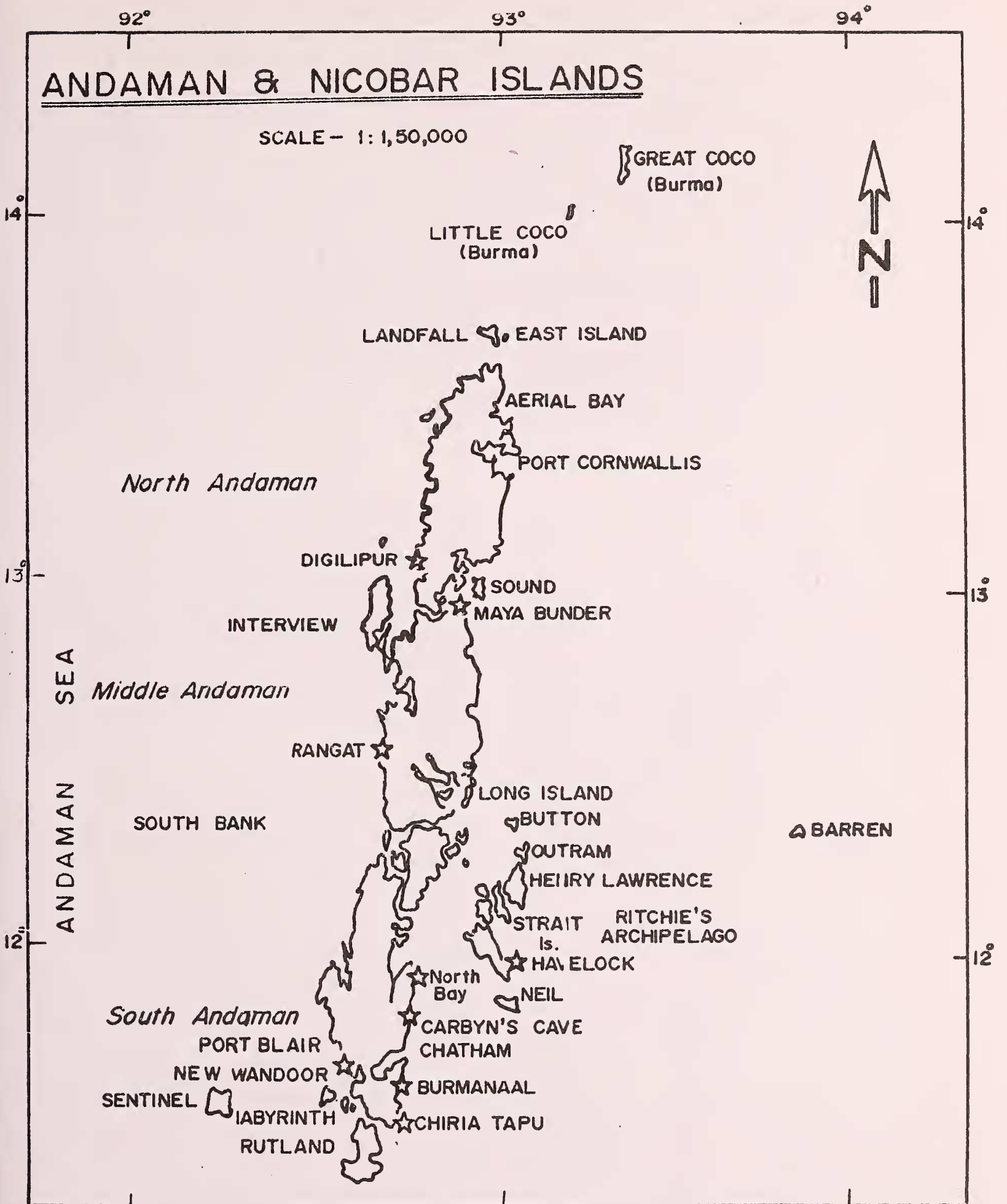


Fig. 1. Collection sites (☆) in Andaman Islands.

The collection chiefly comprises of 26 species of Alcyonaceans.

In addition, the species collected are of new geographical records found for the first time in this region. Table 1 presents the systematic account of the species with ecological information on habitat, faunistic composition and availability. The average temperature, salinity, pH and dissolved oxygen of the surrounding water are min. 25.5°C and max. 32.0°C, min. 30.51 ppt and max. 33.08 ppt, min. 7.71 and max. 8.54, min. 2.91 ml/l and max. 4.64 ml/l respectively.

This study shows that coral reefs of the Andaman and Nicobar Islands contain a diverse alcyonacean fauna. These comprise of *Sinularia*, *Sarcophytum*, *Lobophytum* and *Cladiella* characteristic of shallow reef habitats, such as reef flats and the upper fore reef zones. They usually create a monospecific carpet composed of numerous colonies, which locally may cover several square metres. The most abundant *Sinularia* in this study are *S. gibberosa*, *S. polydactyla*. The abundant *Lobophytum* are *Lobophytum strictum* and *L. pusillum*. *Cladiella pachyclados* is the most common species in all reef localities. Its colonies are usually found on the reef flats of Chiriatapu, Burmanaal, Carbyn's Cove and also found in the subtidal areas of North Bay. Similarly the genus *Sarcophyton* represented by the species *Sarcophyton trocheliophorum* is the most abundant soft coral. Colonies of this species create dense mats below the reef flats or on reef slopes (Wandoor, 2-5 m). Large colonies of *S. trocheliophorum* with a disc diameter of 50-80 cm, are a usual sight. *S. andamanensis*, a new species found during the current survey (Jayasree and Parulekar, in press) is widespread in the entire intertidal area of Carbyn's Cove. Most of these colonies bear small buds arising from the stalk. It is assumed that they detach from the colony and serve for asexual propagation. Also this species morphology shows that it has less abundance of sclerites, flexibility and hollow tubular nature of coenenchyme. These characters are quite essential for this intertidal soft coral, where there is less current

and wave action, these can accumulate more water in their hollow interior so that they are not desiccated during low tides.

All 6 *Lobophytum* species are found in the subtidal waters. These colonies usually grow in the rocky crevices or between stony corals. The reason for the rarity of *L. pauciflorum* at the reefs of Havelock, is due to the absence of rocks and over exploitation of stony corals by tourism and commercial activities.

*Nephthea* species inhabit mostly the depressions on reef flats at Chiriatapu and North Bay (2 m). The faunal characteristics of this region appear to be of the Indo-Pacific zoogeographical pattern. Most of the species have been described earlier from the Pacific Ocean (Verseveldt 1980, 1982 and 1983).

One of the most striking features of many alcyonaceans is patchy distribution (Benayahu and Loya 1977, 1981; Tursch and Tursch 1982). This feature may promote varied species composition and abundance in different localities. Such a spatial distribution results from the short pelagic phase of the planulae and their settlement (Benayahu and Loya 1984c). It is reported that asexual reproduction which is common in many soft corals may cause development of monospecific aggregations (Benayahu and Loya 1984b).

The important limiting factor for alcyonacean distribution is the availability of firm substratum suitable for larvae to settle. The present survey reveals that the soft coral assemblages at Andaman and Nicobar Islands are correlated with the suitable habitat and environmental factors (Dinesen 1983). Similar distribution of alcyoniid genera was recorded on reef flats off the Great Barrier Reef, Australia (Dinesen 1983).

Although the present survey lacks data on the soft coral diversity in deeper zones, it appears that in shallow waters of Andaman and Nicobar Islands soft corals are dominated by accumulations of numerous alcyoniids.

Competitive interactions with other reef organisms clearly play an important role in determining the distribution of soft corals (Benayahu

TABLE I  
SPECIES COMPOSITION, DISTRIBUTION AND ECOLOGICAL INFORMATION ON ANDAMAN ISLAND SOFT CORALS

Species	Habitat & Depth	Association	Availability	Month & Year of collection	Place of collection
Genus <i>Sinularia</i> , May, 1898					
1. <i>Sinularia maxima</i> Verseveldt, 1971	Shallow, 1 m	Sponge, seaweeds mostly brown algae.	Frequent	March, 1992	Havelock
2. <i>Sinularia ornata</i> , Tixier-Durivault, 1970	Intertidal	Seaweeds and sponge, <i>Tedania</i> .	Abundant	March, 1992	Havelock
3. <i>Sinularia sandensis</i> , Verseveldt, 1977	Intertidal	Seaweeds and sponge, <i>Tedania</i> .	Frequent	March, 1992	Havelock
4. <i>Sinularia manaarensis</i> Verseveldt, 1980	Intertidal	Seaweeds, <i>Holothuria</i> <i>scabra</i> and sponge, <i>Tedania</i> .	Frequent	March, 1992	Chiriatapu & Rangath
5. <i>Sinularia depressa</i> , Tixier-Durivault, 1970	Intertidal	Living and non-living scleractinians, crabs and sponges.	Abundant	March, 1992	Mayabundar
6. <i>Sinularia vrijmoethi</i> Verseveldt, 1977	Intertidal	Living and non-living scleractinians crabs and sponges.	Abundant	March, 1992	Mayabundar
7. <i>Sinularia gibberosa</i> Tixier-Durivault, 1970	Sub-tidal (1-5 m)	Mostly non-living scleractinians and <i>Actinopyga</i> <i>mauritiana</i> and <i>Holothuria scabra</i> .	Abundant	November, 1991 March, 1992	Digilipur Havelock North Bay
8. <i>Sinularia ovispiculata</i> Tixier-Durivault, 1970	Sub-tidal (2 m)	Living and non-living scleractinians, sponge, <i>Dysidea herbacea</i> .	Frequent	March, 1992	Digilipur
9. <i>Sinularia granosa</i> Tixier-Durivault, 1970	Sub-tidal (2 m)	Living and non-living scleractinians, sponge, <i>Dysidea herbacea</i> .	Frequent	March, 1992	Digilipur
10. <i>Sinularia flexibilis</i> (Quoy & Gaimard, 1833)	Sub-tidal (2 m)	Living and non-living scleractinians, sponges.	Frequent	March, 1992	Digilipur
11. <i>Sinularia hirta</i> (Pratt, 1903)	Sub-tidal (2 m)	Living and non-living scleractinians, sponges and sea cucumbers.	Frequent	March, 1992	Digilipur Havelock
12. <i>Sinularia polydactyla</i> (Ehrenberg, 1834)	Sub-tidal & Intertidal (1-3 m)	Sea-weeds and sea grasses.	Abundant	March, 1992	Havelock & Mayabundar

Species	Habitat & Depth	Association	Availability	Month & Year of collection	Place of collection
Genus: <i>Lobophytum</i> Von Marenzeller					
1. <i>Lobophytum pauciflorum</i> (Ehrenberg, 1834)	Sub-tidal (2 m)	Shrimps, fishes, sea-grasses and few living scleractinians.	Rare	November, 1991	Chiriatapu
2. <i>Lobophytum hirsutum</i> Tixier-Durivault, 1956	Intertidal	Living and non-living scleractinians, crabs and sponges.	Abundant	March, 1992	Mayabundar
3. <i>Lobophytum batarum</i> Moser, 1919	Sub-tidal (4 m)	Living scleractinians with sea lilies, sea cucumbers, giant clam fishes & occasional appearance of <i>Acanthester planci</i> .	Abundant	November, 1991	Wandoor
4. <i>Lobophytum pusillum</i> Tixier-Durivault, 1970	Sub-tidal	Living scleractinians with sea lilies, sea cucumbers, giant clam fishes & occasional appearance of <i>Acanthester planci</i> .	Abundant	November, 1991	Wandoor
5. <i>Lobophytum strictum</i> Tixier-Durivault, 1957	Sub-tidal & Intertidal (1-3 m)	Living scleractinians with sea lilies, sea cucumbers, giant clam fishes & occasional appearance of <i>Acanthester planci</i> .	Abundant	November, 1991	Wandoor, North Bay and Burmanaal
6. <i>Lobophytum catalai</i> Tixier-Durivault 1957	Sub-tidal (2 m)	Living and non-living scleractinians, sponge <i>Dysidea herbacea</i> .	Frequent	March, 1992	Digilipur
Genus: <i>Sarcophyton</i> Lesson, 1834					
1. <i>Sarcophyton trocheliophorum</i> Von Marenzeller, 1886	Intertidal Sub-tidal (2-5 m)	Living scleractinians and sea anemones.	Frequent	November, 1991 March, 1992	Carbyn's Cove & Digilipur
2. <i>Sarcophyton elegans</i> Moser, 1919	Sub-tidal (2 m)	Living and non-living scleractinians, sponges <i>Dysidea herbacea</i> .	Frequent	March, 1992	Digilipur
3. <i>Sarcophyton stellatum</i> Kukenthal, 1910	Sub-tidal (4 m)	Living scleractinians with sea lilies, sea cucumbers, giant clam fishes and occasional appearance of <i>Acanthester planci</i> .	Abundant	November, 1991	Wandoor

Species	Habitat & Depth	Association	Availability	Month & Year of collection	Place of collection
4. <i>Sarcophyton andamanensis</i> sp. nov.	Rocky Intertidal	Sea-anemone, <i>Radianthus</i> sp., sea cucumber, <i>Holothuria scabra</i> and non-living scleractinians.	Rare	November, 1991	Carbyn's Cove and Chiriatapu
5. <i>Sarcophyton buitendijki</i> Verseveldt, 1978	Intertidal	Non-living scleractinians, sea cucumbers, <i>Holothuria scabra</i> .	Abundant	March, 1992	Mayabundar
6. <i>Sarcophyton crassocanle</i> Moser, 1919	Intertidal	Non-living scleractinians, sea cucumbers, <i>Holothuria scabra</i> .	Rare	November, 1991	Carbyn's Cove
Genus: <i>Cladiella</i> Gray, 1869					
1. <i>Cladiella pachyclados</i> Klunzinger, 1877	Reef flats up to (3 m)	Seaweeds, sea cucumbers, <i>Holothuria scabra</i> , sponge- <i>Tedania</i> .	Abundant	November, 1991	Chiriatapu, Burmanaal and Carbyn's Cove
Genus: <i>Nephthea</i> Gray, 1862					
1. <i>Nephthea</i> sp.	Reef flats & sub-tidal (2 m)	Seaweeds, sea cucumbers, <i>Holothuria scabra</i> , sponge- <i>Tedania</i> .	Abundant	November, 1991	Chiriatapu, North Bay

and Loya 1981, Sammarco *et al.* 1983). It is suggested that the abundance of alcyonaceans could be regulated by difference in life history parameters, mainly reproductive strategies (Benayahu 1985). Benayahu also reported that the rare occurrence of Nephtheids is due to their low reproductive potential and short distance dispersal of planulae. Life history studies on these soft corals would probably provide additional explanation for the distributional patterns of the various species. The alcyonarian fauna of the shallow reefs of Andaman and Nicobar Islands appear to be very rich, compared to the intertidal areas, being mostly prominent on places covered by living scleractinians or non-living scleractinians. It is reported, that in general when there are more living scleractinians, there are less alcyonaceans and vice-

versa (Fishelson 1970). This selective occurrence of the two most important components of reef habitats seems to be controlled by environmental factors or by competition. The most important of these factors appear to be wave actions, the amount of sediment in the water and extreme low tides. Scleractinians are much more adapted to withstand wave actions, whereas alcyonaceans may be less sensitive to sedimentation.

Other associations are reef fishes such as pomacentrids, shrimps, sea cucumbers, *Holothuria scabra*, *Thelenata ananas* and *Actinopyga mauritiana*, sea anemone, *Stoichactis giganteum* with a symbiotic fish, *Amphiprion*, sponge, *Dysidea herbacea* and *Tedania* sp., crabs, seaweed mostly of brown, green algae and the sea grass *Thalassia* sp.

This preliminary survey leaves no doubt about the rich and highly diverse soft coral fauna of this geographical area though no quantitative comparative data are available as yet for other locations. It is suggested that further exploration would help us obtain new alcyonacean records.

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